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10/598,663	09/07/2006	Andy Ziegler	PHDE040070US	8637

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS
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EXAMINER
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ART UNIT	PAPER NUMBER
2882	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<table>
<tr><td rowspan="2">Office Action Summary</td><td>Application No.</td><td>Applicant(s)</td></tr>
<tr><td>10/598,663</td><td>ZIEGLER, ANDY</td></tr>
<tr><td></td><td>Examiner</td><td>Art Unit</td></tr>
<tr><td></td><td>ALEXANDER H. TANINGCO</td><td>2882</td></tr>
</table>

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>07 September 2006</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-12</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-12</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>07 September 2006</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
           application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>09/07/2006</u>.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Specification

The specification is objected to because it refers to claims 1-12, which may

create discrepancies and new matter issues if future claim amendments were to be

made. Therefore, the examiner suggests removing all references to the claims that are

in the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
conditions and requirements of this title.

Claim 12 is rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter.

The claims are drawn to a computer program per se. Computer programs per se

are abstract instructions. Therefore, a computer program is not a physical thing

(product) nor a process as they are not "acts" being performed. As such, these claims

are not directed to one of the statutory categories of invention (See MPEP 2106.01), but

are directed to nonstatutory functional descriptive material.

It is noted that computer programs embodied on a computer readable medium or

other structure, which would permit the functionality of the program to be realized, would

be directed to a product and be within a statutory category of invention, so long as the

computer readable medium is not disclosed as non-statutory subject matter per se

(signals or carrier waves).

For examination purposes the examiner will interpret "computer program" as computer readable medium.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Elbakri et al. (US 6,507,633).

With regards to claim 1, Elbakri et al. disclose a method comprising the step of: reconstructing an image of the object of interest on the basis of the data set (Col. 5 Lines 41-45); wherein a statistical weighing is performed during reconstruction of the image (Col. 5 Lines 54-56).

With regards to claim 2, Elbakri et al. disclose a method comprising a step wherein the data set is a projection data set acquired by means of a source of electromagnetic radiation generating a beam and by means of a radiation detector detecting the beam (Col. 5 Lines 55-59; Fig. 1).

With regards to claim 3, Elbakri et al. disclose a method comprising a step wherein the source of electromagnetic radiation is a polychromatic x-ray source (Col. 5 Line 58); wherein the source moves along a helical path around the object of interest

(Col. 1 Line 51); and wherein the beam has one of a cone beam geometry and a fan

beam geometry (Col. 1 Lines 48-54).

With regards to claim 4, Elbakri et al. disclose a method comprising a step

wherein the reconstruction of the image is performed on the basis of an iterative

algorithm comprising a plurality of update steps until an end criterion has been fulfilled

(Abs.).

With regards to claim 5, Elbakri et al. disclose a method comprising a step

wherein the iterative algorithm is a maximum likelihood algorithm (Col. 8 Line 21);

wherein the reconstructed image has the highest likelihood (Col. 8 Line 21); and

wherein the weighing is performed in each update step of the plurality of update steps

(Col. 8 Line 59 – Col. 9 Line 55).

With regards to claim 6, Elbakri et al. disclose a method comprising the step of:

determining a number of detected photons during acquisition of the data set (Col. 8

Lines 13-15); wherein the weighing is based on a statistical error of the number of

detected photons (Col. 14 Lines 45-50).

With regards to claim 8, Elbakri et al. disclose a method comprising a step

wherein the reconstruction of the image is based on a sub-set of at least two projections

of all acquired projections of the projection data set (Col. 5 Lines 61-63).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set
forth in section 102 of this title, if the differences between the subject matter sought to be patented and
the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elbakri et al. (US 6,507,633) as applied to claim 5 above, and further in view of Lange et al. (Globally Convergent Algorithms for Maximum a Posteriori Transmission Tomography).

With regards to claim 7, Elbakri et al. disclose a method as recited above in claim 5. Elbakri et al. teach a method comprising maximum likelihood and Poisson distribution (Col. 8 Lines 1-24; Col. 11 Line 21 – Col. 12 Line 15; Equations 9 and 10-28). Elbakri et al. fail to explicitly teach a method comprising the step of: determining a number of detected photons Y_i during acquisition of the data set; wherein the weighing is based on a statistical error σ_{Yi} of the number of detected photons Y_i; wherein an update of an attenuation parameter μ_j^{n+1} is calculated from the attenuation parameter μ_j^n

$$\mu_j^{n+1} = \mu_j^n + \mu_j^n \frac{\sum_i l_{ij} \frac{\sum_i l_{ij} \left[d_i e^{-d_i \mu^n} - Y_i \right] / \sigma_{ij}^2}{\sum_i l_{ij} / \sigma_{ij}^2}}{\sum_i l_{ij} < l_i, \mu^n > d_i e^{-d_i \mu^n}}$$

by

wherein d_i is a number of photons emitted by the source of radiation;

wherein l_{ij} is a basis function of an i-th projection;

wherein l_i is a vector of basis functions l_{ij} of the i-th projection;

and wherein $<l_i, \mu> = \sum_j l_{ij} \mu_j$ is an inner product.

Lange et al. teach a method comprising the step of: determining a number of detected photons Y_i during acquisition of the data set; wherein the weighing is based on

a statistical error σ_{Y_i} of the number of detected photons Y_i; wherein an update of an

attenuation parameter μ_j^{n+1} is calculated from the attenuation parameter μ_j^n by

$$\mu_j^{n+1} = \mu_j^n + \mu_j^n \frac{\sum_i l_{ij} \left[\frac{\sum_k \left|d_k e^{-\langle l_i, \mu^n \rangle} - Y_i\right| / \sigma_{Y_i}^2}{\sum_k l_{ij} / \sigma_{Y_i}^2}\right]}{\sum_i l_{ij} < l_i, \mu^n > d_k e^{-\langle l_i, \mu^n \rangle}}$$

(Equations 1-7). It would have been obvious to one of ordinary skill in the art, at

the time of invention to modify the invention of Elbakri et al. to include the featues of

Lange et al. One would have been motivated to make such a modification to reduce

artifact thus improving image quality as implied by Lange et al.

Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Elbakri et al. (US 6,507,633) in view of August (US 2003/0219152).

With regards to claims 9, 11, and 12, Elbakri et al. disclose a data processing

device, comprising: a memory for storing a data set of an object of interest (Fig. 1); a

data processor for performing artifact correction in the data set of the object of interest,

wherein the data processor is adapted for performing the following operation (Fig. 1;

Abs.): reconstructing an image of the object of interest on the basis of the data set (Fig.

1; Col. 5 Lines 41-45); wherein a statistical weighing is performed during reconstruction

of the image (Col. 5 Lines 54-56; Fig. 1). Elbakri et al. fail to explicitly teach an

apparatus wherein a data processor is adapted for performing the following operation:

loading the data set. August teaches an apparatus wherein a data processor is adapted

for performing the following operation: loading the data set [0050; Fig 2 note: **50**]. It

would have been obvious to one of ordinary skill in the art, at the time of invention to

modify the invention of Elbakri et al. to include a computer readable medium as taught

by August. One would have been motivated to make such a modification to more easily

update existing systems to implement the invention as implied by August.

With regards to claim 10, Elbakri et al. as modified above disclose a data

processing device wherein the reconstruction of the image is performed on the basis of

an iterative algorithm comprising a plurality of update steps until an end criterion has

been fulfilled (Abs.); wherein the iterative algorithm is a maximum likelihood algorithm;

wherein the reconstructed image has the highest likelihood (Col. 8 Line 21); and

wherein the weighing is performed in each update step of the plurality of update steps

(Col. 8 Line 59 – Col. 9 Line 55).

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to ALEXANDER H. TANINGCO whose telephone number

is (571)272-8048. The examiner can normally be reached on Mon-Fri 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander H Taningco/
Examiner, Art Unit 2882

/Courtney Thomas/
Primary Examiner, Art Unit 2882